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December 12, 2001

SUBJECT: EVALUATION AND REPORTING ON CONTAMINANT HYDROGEOLOGICAL CONDITIONS AT THE TAJIGUAS LANDFILL

This is the completed report on evaluating the Draft EIR. Based on the reviewed information, our conclusion is that the Tajiquas Landfill as of today, poses undetermined likely risk to human health, drinking water and the environment. We recommend steps, that we believe, can help to assess the impact on the environment and design adequate mitigation plan.

We thank you for the opportunity to be part of this project and we are looking forward to work with you in the future on other environmental issues.

Sincerely,

REGISTERED GEOLOGIST FRANKLIN J. GOLDMAN CERTIFIED HYDROGEOLOGIST NO. 466 STATE OF CALIFORNIA

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George Pavlov

EVALUATION OF THE
DRAFT EIR
AND SELECTED REGULATORY CASE FILE TECHNICAL REPORTS ASSOCIATED WITH THE
TAJIGUAS SANITARY LANDFILL

Prepared for:

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INTRODUCTION

Tajiguas Landfill was opened by Santa Barbara County in 1967 as a Class III solid waste disposal site. Small volumes of waste had been unofficially dumped on the canyon floor even before the site came under County control. Does not appear to be any record for any removal of alluvium. During the initial period of County operation, land filling took place along both banks of the Canada de la Pila streambed, from which flow had not been diverted. Waste was then placed in the streambed, damming off runoff from the upper watershed. Currently the landfill is permitted to receive 1,500 tons per day of municipal solid waste.

The landfill area occupies the central portion of the Canada de La Pila, a narrow canyon cut into the south flank of the Santa Ynez Mountains. Canada de la Pila Creek flows directly into the Pacific Ocean, about 0.4 mile south of the landfill. Elevations range from 120 feet above msl in the lower canyon area at the surface discharge point to about 1150 feet at the watershed divide. Canada de La Pila is an ephemeral creek and drains a watershed of about 468 acres. Of this, about 200 acres lie upstream from the landfill along the main canyon.

The Technical Report, prepared by the County of Santa Barbara, Department of Public Works, Solid Waste & Utilities Division, defines four laterally contiguous segments of the Pila Creek drainage basin, based upon physiographical characteristics and land use practices which are listed as follows:

- The relatively undisturbed headwaters area;
- The upper canyon area;
- The landfill area;
- The lower canyon area.

The landfill area includes the majority of the watershed area that has been disturbed by site development activities. The landfill itself occupies approximately 78 acres.

According to the Santa Barbara County Flood Control Districts 1993 Precipitation Report, the mean annual rainfall at the Tajiguas rain gaging station is 17.75 inches, and the depth of the 100-year, 24-hours storm is 7.85 inches. The average annual runoff is five inches per year.

Rainfall in the northernmost portion of the Pila Creek watershed is a 20.01 inches per year area-weighted average and 18.34 inches per year area weighted average precipitation for the lower watershed area (Santa Barbara County Public Works Department - Solid Waste and Utilities Division, 2001). The calculated runoff from the upper and lower watershed areas are estimated to be 25 AF per year and 21 AF per year, respectively; resulting in a total combined runoff of 46 AF per year.

Geologic materials identified during field mapping and drilling consist of Quaternary-age alluvium, colluvium and artificial fill which overly Tertiary-age bedrock consisting of the Rincon Shale and the Monterey Formation. The alluvium consists of recent stream-laid deposits of Canada de Ia Pila Creek and occurs in a narrow zone in the canyon bottom. Recent alluvium unconformably overlies fill and colluvial soil in the valley bottom. The older alluvium unit underlies artificial fill and colluvial soils and overlies Rincon Shale. The older alluvium consists of silty to locally gravelly sand and is similar to the recent alluvium in composition. Colluvium consists of a heterogeneous mass of soil or rock fragments deposited by sheetflow or gradual accumulation at or near the base of a slope.

The contact between the Rincon Shale and the Monterey Formation trends roughly east-west on both sides of the canyon and dips approximately 50 to 60 degrees to the south. The contact between the two appears to be transitional over a 10 to 20 foot thick zone.

A zone of weathered bedrock, generally less than ten feet thick, is present over most of site area.

The Rincon Shale is the bedrock formation that underlies most of the landfill area as well as a broad area to the north. It is predominantly a grey to olive-drab mudstone containing ½ to 2 foot thick interbeds of orange-brown weathering dolomitic limestone, foraminiferal marl and pale yellow brown to olive-brown bentonitic, lithic-vitric tuff at the top of the formation.

Bedding in the Rincon Shale and the Monterey Formation at the site trend approximately east-west and homoclinally dip about 60 degrees to the south. Local variations in strike and dip occur, most of which appear to be related to faulting.

A fault zone is observed in a surface outcrop approximately 500 feet east of the canyon bottom, near the Rincon to Monterey contact. This fault zone strikes N80E and dips approximately 80 degrees to the south. The fault shows a reverse sense of movement and juxtaposes the Rincon and Monterey rocks. The projected trace of this fault would cross the canyon bottom. This fault has not been mapped directly on the site. (D&M, 1988)

SECTION A

Groundwater in contact with landfill waste

A pumping system removes water coming from the upper canyon area behind the landfill in the canyon bottom in attempt to reduce inflows into the landfill bottom. Some surface water and groundwater however, enters the landfill along several paths, the most important of which may be the streambed and the streambed alluvium left in place under the landfill. Another source of recharge for the water table in the landfill would be direct infiltration of the rainfall.

The basal groundwater table (see September 2001 Hydrologic Investigations Status Report by ARCADIS G&M, page 15 of 17, Image 110) within the Tajiguas Landfill waste mass has been defined by the groundwater present in monitoring and dewatering wells located throughout the landfill (see **GeoSolv cross section**, based upon well data from the July 2001 SEMI-ANNUAL WATER QUALITY MONITORING REPORT PREPARED BY COUNTY OF SANTA BARBARA PUBLIC WORKS DEPARTMENT SOLID WASTE & UTILITIES DIVISION). This is a clear violation of the 5-foot separation rule which states that the bottom of the landfill waste mass must be five or more vertical feet above the highest seasonal groundwater table. (Combined SWRCB/CIWMB Regulations Division 2, Title 27, Article 3, §20240 and Title 23, Divison 3, Chapter15, Article 3, §2530)

A review of the Collection Trench Profile and Details in the June 17, 1998 Corrective Action plan shows that the original trench excavation was founded in at least eight (8) feet of unweathered Rincon to intercept some of the underflow of groundwater contaminated by the landfill from exiting the confines of the landfill and migrating offsite to the beaches and ocean. Although, this implies that the unweathered Rincon is impermeable, the Environmental Impact Report, TABLE 3.2-3 STRATIGRAPHY OF TAJIGUAS LANDFILL PROJECT SITE) states that the "**The unweathered Rincon is mainly massive, but zones of intensely fractured rock have been observed.**" The Environmental Impact Report, page 3.3-9 states, "The **groundwater flows** from topographically high areas downward to stream channels, **where the flow emerges** as discharge to the streams if the water level is high enough or **as underflow** in alluvial fill or **fractured bedrock below the channel**." It is clear that intensely fractured rock likely exists in bedrock below the channel and can be very permeable allowing contaminated underflow to bypass the interceptor trench. The original topography and Pila Creek bed are shown on GeoSolv **Original Topography of Vicinity of Pila Creek** map.

The Collection Trench Profile and Details cross section also verifies that the 20 to 35 feet of soil exposures on the east and west sides of the trench are permeable alluvium. (**See GeoSolv Tajiguas Landfill Map**) This provides migratory pathways for contaminated groundwater to bypass the trench and contaminate groundwater in the Monterey Shale formation, at the Arroyo Quemada community and the beaches beyond.

Since the community of Arroyo Quemada utilize groundwater from the Monterey/Alluvium hydrogeologic unit for domestic supply, the landfill is posing a threat to groundwater with potential and or existing drinking water beneficial uses (see page 3.3-49 of the EIR). Furthermore, unless otherwise indicated within the Basin Plan or a formal Regional Board Order which de-designates a surface or groundwater body's beneficial use designation, groundwater in the Rincon, Vaqueros and Sespe-Alegria, and the Gaviota hydrogeologic units are considered to have potential or existing drinking water beneficial use designations. Therefore, contaminated groundwater in the Rincon in direct contact with the contaminated groundwater that saturates the landfill mass, is considered to be drinking water and should be treated as such. The draft EIR conspicuously leaves out the beneficial use designations for the groundwater in the Rincon Hydrologic Unit.

On page 3.3-17 of the Draft EIR the Monterey Formation is stated to consist of "weathered and fractured Monterey Formation shales and siltstones south of the existing landfill, as well as valley bottom alluvial and colluvial deposits in the lower canyon area." Since the monitoring wells, located down gradient of the interceptor trench, are founded in colluvium, contaminated groundwater underflow in the fractured shales and siltstone may escape the grossly inadequate monitoring system and reach the beach and ocean.

Since, based on the preceeding discussion, the interceptor trench does not prevent all groundwater from escaping the landfill, it is necessary to establish its overall effectiveness.

The surface run-off in the upper portion of the Pila Creek watershed is captured in three retention basins located directly north of the current landfill. One is an out-of-channel basin and two are in-channel basins located at an approximate elevation of 400 to 500 feet above MSL. All three retention basins are unlined and are constructed in natural soils. The out-of-channel basin captures storm water runoff predominantly from south and west-facing slopes along the east side of Pila Creek and upstream of the landfill area. Excess runoff from this out-of-channel basin is captured in the two nearby in-channel basins.

The water from the three basins is routed west of the landfill area in a 48 inch culvert, which is emptied into the streambed of Pila Creek at a box culvert opening located approximately 200 feet south of the administrative buildings. The box culvert opening is identified as the landfill's surface water discharge point. This surface-water diversion system was not installed until the landfill had been raised about 25 feet above the streambed.

Surface water runoff from a portion of the landfill upper deck and portions of the bench areas also drain into this 48-inch culvert. It would seem that surface water may have come in contact with the landfill mass and will be contaminated. Periodic monitoring for dissolved chemicals in the water of the diversion system is needed.

The east culvert system collects storm water runoff from the majority of the landfill proper and routes it to the same discharge point.

The interceptor trench is reported to receive groundwater from underflow from alluvium and formation rock as well as from water which is collected by the GLCRS. As of June 4, 1998 (i.e. approximately 6 years of water collection), they have produced 9,106,943 gallons of water from the trench (i.e. 1,517,824 gallons of water collected per year). This large volume of water appears to come from two sources; basal groundwater underflow contaminated by the landfill mass and from leachate collection pipes located in the upper portions of the landfill.

According to the October 2000 Technical Report Review of Surface Water Resources Page 6, the Pila Creek watershed yields 46 acre feet per year (i.e. 14,988,125 gallons) and only 1,517,824 gallons of water is collected by the trench each year. Since Pila Creek is not equipped with a stream gauging station, it is not known how much surface water run-off is captured by the culvert systems which are directing the flow into the Pila Creek bed at the surface water discharge point.

Since up to 13 million gallons of water per year potentially bypass the collection trench, it is important to have an accurate account of the total surface water run-off, collected by the culvert systems. The balance between the 13 million gallons and the amount of water, measured at the surface water discharge point, will provide the volume of groundwater contaminated by the landfill mass, escaping the collection trench. The water balance must include a determination as to how much water is used for irrigation, what types of earth materials are undergoing irrigation, all methods of distribution and application of irrigation water, and where and when the irrigation is performed. In this way it can be determined how much water is lost to evapotranspiration, evaporation, and the landfill mass itself, etc.

INVESTIGATION AND MONITORING CONTAMINANT MIGRATORY PATHWAYS

The current groundwater monitoring system seems inadequate to intercept the dissolved contaminants in groundwater bypassing the trench. Regulations state that a sufficient number of groundwater monitoring points must be established to assure that contaminants cannot bypass the monitoring well network (Article 4, §20415 (D)).

Many springs which have been reported in the Cady Declaration which are representative of some of the groundwater flow paths not addressed in any technical documents to date, are supposed to be clearly identified on a map so that their influence on landfill contaminant migration can be evaluated (Article 4, §21750 (g) (5)). See regulatory reference bellow.

§21750. SWRCB - Waste Management Unit (Unit) Characteristics and Attributes to be Described in the ROWD. [C15: §2595 & §2547(a) // T14: §17777, §18260, §18263, & §18264]

(a) **Identify Potential Impairment** — Dischargers shall provide in the report of waste discharge ("ROWD", including any such report integrated into a Joint Technical Document (JTD), pursuant to §21585) an analysis describing how the ground and surface water could affect the Unit and how the Unit, including how any waste, if it escapes from the Unit, could affect the beneficial uses of ground water bodies (including, but not limited to, any aquifers underlying the facility) and surface water bodies. The RWQCB shall use this information to determine the suitability of the Unit with respect to ground water protection and avoidance of geologic hazards and to demonstrate that the Unit meets the classification criteria set forth in Article 3, Subchapter 2, Chapter 3, Subdivision 1 of this division (§20240 et seq.).

(g) Hydrogeology.

(1) General — An evaluation of the water bearing characteristics of the natural geologic materials identified under (f)(2)including determination of hydraulic conductivity, delineation of all ground water zones and basic data used to determine the above.

(5) Springs — A map showing the location of all springs within the waste management facility and within one mile of its perimeter. The map shall be accompanied by tabular data indicating the flow and the mineral quality of the water from each spring.

Two parallel groundwater monitoring curtains should be placed on either side of the interceptor trench to determine the nature of contaminated groundwater which bypasses the trench.

On pages 3.3-18, 3.3-21, and 3.3-22 the draft EIR states,

"A component of the southward groundwater flow is blocked by cross-strike (east-west trending), low permeability aquitard units. For example, water level monitoring data indicate that some groundwater flow within the Vaqueros aquifer is deflected eastward, around the Rincon Formation (aquitard), where it may discharge as base flow to the alluvium in Arroyo Quemado (EMCQN, 1994b). This suggests that bedrock aquifers exposed in Canada de la Pila may be hydraulically connected to those in adjacent canyons and watersheds via lateral flow along contacts with aquitard units.

These conditions indicate that at least a portion of the groundwater within the Vaqueros Formation flows eastward and may discharge to the Arroyo Quemado alluvium.

Seasonally, Vaqueros Formation water levels in monitoring wells e.g., (MW-10 and MW-13) near the former Pila Creek channel appear to be at or above the former ground surface elevation of approximately 250 feet above msl. This implies that a portion of the groundwater from the Vaqueros Formation likely discharges to the former Pila Creek channel alluvium or artificial fill beneath the existing landfill. As of late 1999, the County SWUD has initiated dewatering and monitoring to minimize this discharge potential."

This groundwater flow diversion must be defined in the subsurface in order to develop a corrective action plan. Such a plan should address methods for preventing the migration of subsurface contaminants to groundwater and surface water by investigation and monitoring of the contaminant migratory pathways. Without a proper understanding of this groundwater flow regime and without knowing the migratory pathways for contaminated groundwater, minimizing the discharge potential of contaminated groundwater by strategically placing monitoring and dewatering wells is very unlikely to be effective and is certainly not verifiable.

Specifically, the groundwater and surface water pathways which can transport high levels of bacteria from the landfill waste to the beach at the Arroyo Quemada

Community where bacteria has been identified must be evaluated. It is curious that the November 2001, Bacteria Source Study, by URS Consultants, only reports water sampling for bacteria in Arroyo Quemado Creek watershed, which is the water shed east of Canada de la Pila watershed. This assumes that the bacteria is coming from Arroyo Quemado Creek and totally ignores the fact that the bacteria can be coming from the landfill directly. It appears, however, that the landfill's operators do not intend to address this issue as is demonstrated by the text in the draft EIR on page 3.3-40 which discusses the high bacteria counts in Ocean water at Arroyo Quemado Beach yet does not even consider addressing the question as to whether or not there is a relationship between water in the landfill waste and the contamination at the beach. Furthermore, the terms "landfill operations" and "landfill activities," which are used to imply these as potential sources of bacteriological contamination at the beach, seem to exclude the concept that the landfill waste mass may be a source of bacteriological contamination via subsurface flows. See excerpt below:

> *As discussed previously, widespread concern has arisen in Santa Barbara County over the presence of high bacteria counts in ocean water which has prompted beach closures and advisories at many County beaches. Of particular concern in the project area is Arroyo Quemado Beach. The beach area fronting the mouth of the creek has been subject to advisory or closure on many occasions since testing began in 1997. Residents in the Arroyo Quemada community and others have suggested that the landfill may be responsible for these conditions. The current evaluation of indicator bacteria focuses on conditions in Pila Creek, the ocean fronting Pila Creek, and a possible relationship between landfill activities and high indicator levels at Arroyo Quemado. Specifically, the data evaluation was designed to address three general questions of interest:*
>
> *1. Do landfill operations contribute to high indicator levels in Pila Creek?*
>
> *2. Do high indicator levels at the mouth of Pila Creek contribute to high long-shore indicator levels near the mouth of Arroyo Quemado Creek?*
>
> *3. Are there notable elevations in indicator levels elsewhere in the Arroyo Quemado watershed that could potentially contribute to high ocean levels near the mouth of Arroyo Quemado Creek?*
>
> *URS (2001) contains considerable detail regarding the levels of bacteria in Pila Creek, the ocean, and the Arroyo Quemado watershed. Based on the available sampling data for the Canada de la Pila watershed downstream of landfill operations, it appears that bacteriological contamination of surface water at the mouth of Pila Creek is related to high bacteriological indicator*

counts recorded at the landfill's surface water discharge point (specifically, sample point p-l 7) during the wet season (i.e., late winter and spring months). Potential sources for this bacterial contamination include: native fauna, runoff from green waste, runoff from the active landfill surface, and avian feces deposited over a wide area of the watershed.

Bacteria contribution from native fauna does not appear to be a dominant source based on the observation that sites upstream from the landfill exhibit low levels of Enterococcus and fecal coliform/E. Coil relative to other sites in the watershed. Just below these sites, at the green waste disposal area, relatively high indicator levels are observed at TJ-03, however runoff from this area is nearly always contained in the out-of-channel sedimentation basin and rarely enters lower Pila Creek, eliminating green waste as a likely dominant contributor. Surface water runoff at the active landfill face during rainfall events is managed so that it is not likely to contribute significantly to bacteria loads. Waste is exposed only during operational hours, which minimizes runoff contact with the waste. However, the widespread presence of feces from the large seagull population that is attracted to the landfill is exposed to runoff during rainfall events and could be a contributing factor.

During the wet season, the degree of bacteria transport to the ocean water at the mouth of Pila Creek is consistent with conditions at other creek locations in the region such as Arroyo Buno, Jalama, Refugio, and Rincon. During the summer months, it does not appear that landfill operations affect bacteriological water quality at the point where Pila Creek discharges to the ocean."

Subsurface investigation is required to define the potential migratory pathways for groundwater contaminated by the landfill waste mass, between the beach and landfill, and to define the vertical and lateral extent of the existing landfill waste mass relative to all adjacent hydrogeologic regimes. Geophysical (such as areal temperature survey) an/or geological investigations should be performed to verify groundwater flow path regimes from recharge in the upper watershed, through the interceptor trench, and final discharge to the beach. An example of the type of point source which sould undergo subsurface investigation is identified on page 2-23 of the draft EIR, which states,

"At some time during either the final closure period or postclosure maintenance period, at existing facilities such as the scale house and maintenance shop are no longer required or are replaced by new facilities, they will be removed. Specific permits that may be required for the removal/demolition of facilities would be obtained at the time of closure of each facility.

SECTION B

Sample Analyses

On Page 2-47, the draft EIR states that

"Groundwater quality for current landfill operations is monitored via eight monitoring wells and one lysimeter."

The current eight groundwater monitoring wells used to monitor the existing landfill are insufficient to identify subsurface flow pathways and contaminant migration, and is more appropriate for a single gas station underground storage tank site.

On page 3.3-43 of the draft EIR, it states that VOCs are the main contaminants of concern and that their apparent decrease in concentrations is due to effective control systems which minimize the impacts to downgradient groundwater from the landfill. This statement admits that the landfill is adversely impacting downgradient groundwater and yet does not explain the character nor the gravity of these impacts. Aside from the fact that there is an insufficient number of groundwater monitoring wells in the most critical locations necessary to evaluate groundwater quality conditions throughout and adjacent to the existing landfill, it is a likely possibility, based upon recent groundwater monitoring lab data, that gasoline constituents as well as chlorinated solvents are emanating from point sources from the landfill mass. The following is the table of contaminants identified within the landfill.

1,4-Dichlorobenzene
1,1-dichloroethane
cis-1,2-Dichloroethene
trans-1,2-dichloroethene
cis-1,2--dichloroethylene
2-methylbutane
1,4-Dichlorobenzene
Methyl t-Butyl Ether
Trichioroethene (TCE)
Hexavalent chromium
benzothiazole
chlorobenzene
chlorodifluoromethane
methoxytrimethylsilane
fluorotrimethylsilane
trimethylsilanol
trimethylsilane (2-methoxyethyl)
1,2,4- trimethylbenzene
vinyl chloride

All groundwater samples should be analyzed for all gasoline constituents as well as for all oxygenates and lead scavengers by EPA Method 8260b. All groundwater samples should also be analyzed utilizing EPA Method 8260b for all constituents, including but not limited to, all chlorinated solvents as well as 1,4, dioxane. In addition, all groundwater and surface water samples should be analyzed for total and fecal coliform and enterococus bacteria. Finally, all chemicals, identiyed in the groundwater in the past must be analysed as well.

All potential point sources of contamination which were burried in the landfill such as barrels of solvents should also undergo point source subsurface investigations.

The scale house and maintenance shop should undergo an immediate point source subsurface investigation based upon a complete Phase I Environmental audit to identify gasoline, chlorinate solvents and other VOCs commonly associated with this type operation.

HOLOCENE FAULTING AND POTENTIAL FOR SURFACE RUPTURE

For the 1988 Expansion EIR, an acceleration number of 0.39g was used. They then revised their number to 0.354g but still claimed that the slopes were still stable at 2/1. The EIR consultant, Geologic Associates, performed the new slope stability analysis using a maximum probable earthquake ground acceleration of 0.21g. This is the original number used in the same consultant's projection for benchfill stability. The slope stability analysis was done under the assumption that the landfill mass is not saturated. Their disclaimer states that if the landfill was saturated then they would not be held to their stability analysis projections.

Another issue is whether or not the proposed expansion is resting upon a Holocene fault. The draft EIR makes no mention as to whether or not the proposed landfill expansion will overly an active fault. On page 3-1 of the September 2001 SLOPE STABILITY EVALUATION, no mention is made as to whether or not local faults may cause surface rupture in the future which may impact the landfill and/or landfill expansion. Also, there is no mention as to whether or not these local faults are Holocene. Furthermore, the text refers to the Dames and Moore, 1995 report, yet does not expressly concur with the reports findings nor does it state specifically that the Dames and Moore report verifies that the faults in questions are Holocene or not.

SECTION C

Numerous violations in the operation of the Tajiguas Landfill have been noted to occur in the past. The landfill management has not made sufficient effort to correct many of them. In light of these fact, it is diffucult to imagine that the landfill operators will be anymore responsible with the expanded landfill. See the following history of viloations beloow.

A May 25, 1993 Regional board evaluation of the Emcon's June 30, 1992, Article 5 report entitled "Water Quality Monitoring Plan and Financial Assistance Report," stated there was a lack of monitoring in the Rincon and Monterey Shale formations and that a VOC plume could migrate without early detection because their wells do not have short screened intervals targeting the top and bottom portions of the aquifers to minimize dilution of the dissolved constituents of concern. The inadequacy of the groundwater monitoring network has still not been addressed.

The May 25, 1993 Regional Board letter required that a plan to define the extent of contamination be submitted. This has also never been completed either. Finally, the Board stated that LANDFILL EXPANSION not be allowed until full compliance with Article 5 has been attained and that the Article 5 Report for the existing Landfill was not adequate to incorporate the proposed expansion.

(93 Correspondence.tif, Images 5 thru 9)

A November 29, 1993 Board letter to the County commenting on the County's May 1991 "Water Quality Solid Waste Assessment Test report (SWAT report)," it stated that the Landfill leaked benzene and 1,4-dichlorobenzene concentrations found in surface water and 1,4-dichlorobenzene was also identifyed in ground water above the primary MCL as well as metals such as total chromium, manganese, and iron in groundwater exceeding primary or secondary MCLs which were above background levels and/or not considered naturally occurring, and therefore are considered to be a threat to water quality.

(93 correspondence, Image 36)

A January 7, 1994 County letter to the Regional board reported the analytical results from ground water samples recovered on November 29 and December 1, 1993 as follows:

MW#2, MTBE @ 13 ppb and 1,4-Dichlorobenzene @ 0.9 ppb

MW#4, cis-1,2-Dichloroethene @ 5.6 ppb, 1,2- Dichiorobenzene @ 0.6 ppb, 1,4-Dichlorobenzene @ 3.7 ppb, MTBE @ 25 ppb and Trichioroethene (TCE) was detected at 0.6 ppb.

No verification as to what point sources of aforementioned contamination in groundwater has been provided.

(94 Correspondence.tif, Image 1)

A March 21, 1994 internal office memo admits that all of their testing for chromium had not including the specification of Hexavalent Chromium from total chromium. Hexavalent chromium had been as high as 0.15 ppm in MW#4 on January 19, 1991 and as high as high as 0.23 ppm in MW#3 on October 27, 1988.

(94 Correspondence.tif, Images 9, 10 , 2 & 3)

A May 4, 1994, Regional board letter to the County reported the following chemicals identified in groundwater and stated that this is indicative of a release:

Compound	MW#2	MW#3	MW#4	MW#10
1, 4-Dichlorobenzene	1.3			5.4
Methyl-butyl Ether	9.3			15.0
1, 2-Dichlorobenzene			0.5	
cis-1, 2 Dichioroethene	0.5			4.8
Trichioroethane			0.5	
Benzene	0.9			
Toluene	0.6			

No verification as to what point sources of aforementioned contamination in groundwater has been provided.

(94 Correspondence.tif, Image 7)

A May 20, 1994 Regional board letter to the County stated that the existing extraction trench was only good for "containing" contamination, but was not acceptable for corrective action and that since the contaminant releases were on-going, more aggressive source control efforts are needed.

(94 Correspondence.tif, Images 13 and 14)

In a July 14, 1994 EMCON letter to the its client, the County, they state, “The presence of MTBE is somewhat odd at a landfill. MTBE is a compound used as a gasoline additive. We typically find it along with BTEX compounds at our LUFF projects, but not at landfills. Since it has not been consistently present in MW-4 several potential sources are possible. Gasoline may have been recently spilled at the equipment service area or during the construction of the collection trench................MTBE should be evaluated since it is inconsistent with typical landfill impacts." No effort has been made to define the source of MTBE at the landfill.

(94 Correspondence.tif, Images 30 thru 33)

A February 1, 1996 County letter to the Regional board reports that the December 11, 1995, fourth quarter sampling event, had the following compounds identified in groundwater monitoring wells:

1) LCRS @ Tank

chlorobenzene @ 1.1 ppb
chlorodifluoromethane @ 5 ppb
fluorotrimethylsilane @ 13 ppb
trimethylsilane (2~methoxyethyl) @ 1 ppb

2) MW#2

chlorodifluoromethane @ 4 ppb
fluorotrimethylsilanevc @ 2 ppb

3) MW#3

chlorodifluoromethane @ 3 ppb
fluorotrimethylsilane @ 1 ppb

4) MW#4

vinyl chloride @ 0.54 ppb
trans-1,2-dichloroethene @ 0.69 ppb
1,1-dichloroethane @ 0.7 ppb
chlorodifluoromethane @ 6 ppb
fluorotrimethylsilane @ 9 ppb
2-methylbutane @ 1 ppb
methoxytrimethylsilane@ ? Ppb

5) MW#12 - unknown hydrocarbon @ 5 ppb

No verification as to what point sources of the aforementioned contamination in groundwater has been provided.

(96 Correspondence.tif, Image 4)

A October 15, 1996 County letter to the Regional board reports that the September
20 & 23, 1996, third quarter sampling event, had the following compounds identified in groundwater monitoring wells:

1) methoxytrimethylsilane in MW#2 @ 9 ppb, MW#3 @ 10 ppb, MW#4 @ 12 ppb, MW#10 @ 6 ppb, MW#12 @ 16 ppb and MW#15 @ 18 ppb

2) trimethylsilanol in MW#2 @ 16 ppb, MW#3 @ 20 ppb, MW#4 @ 29 ppb, MW#10 @ 74 ppb MW#12 @ 36 ppb, MW#14 37 ppb and
MW#15 39 ppb

3) fluorotrimethylsilane in MW#2 @ 8 ppb, MW#14 @ 16 ppb and MW#15 34 ppb.

4) benzene in MW#10 @ 0.7 ppb

5) cis-1,2-dichloroethene @ 0.6 ppb

No verification as to what point sources of aforementioned contamination in groundwater has been provided.

(96 Correspondence.tif, Image 18)

A July 8, 1997 (incorrect letter date July 8, 1996) County letter to the Regional board reports that the June 23 & 24, 1997, second quarter sampling event, had the following compounds identified in groundwater monitoring wells:

1) methoxytrimethylsilane in MW#10 @ 9.1 ppb, MW#12 @ 5.1 ppb;

2) trimethylsilanol in MW#10 @ 150 ppb;

3) fluorotrimethylsilane in MW#15 @ 11 ppb

4) benzene in MW#10 @ 0.79 ppb

5) 1,2,4- trimethylbenzene in MW#15 @ 0.77 ppb

No verification as to what point sources of aforementioned contamination in groundwater has been provided.

(97 Correspondence.tif, Image 17)

A July 21, 1997, semi-annual, winter/spring 1997, MONITORING AND REPORTING PROGRAM NO. 93-69 report identified the following chemicals in the GLCRS on March 18, 1997.

(1) cis-1,2--dichloroethylene @ 1.0 ug/1,

(2) 1,4-dichlorobenzene @ 1.3 ppb

and the following chemicals were identified in the GLCRS on June 23, 1997.

(1) cis-1,2-dichloroethylene @ 1.6 ppb

(2) 1,2-dichlorobenzene @ 0.64 ppb

(3) 1,4-dichlorobenzene @ 2.6 ppb

(4) chlorobenzene @ 1.0 ppb

(5) benzene @ 0.61 ppb

(6) MTBE @ 40 ppb

(7) trimethylsilanol @ 23 ppb

No verification as to what point sources of aforementioned contamination in groundwater has been provided.

(97 Correspondence.tif, Image 18)

An October 8, 1997 County letter to the Regional board reports that the September 15 & 16, 1997, third quarter sampling event, had the following compounds identified in groundwater monitoring wells:

1)fluorotrimethylsilane in MW#3 @ 12 ppb, MW#14 @ 5.3 ppb and MW#15 @ 65 ppb

2) trimethylsilanol in MW#3 @ 17 ppb, MW#10 @ 150 ppb, MW#13@ 58 ppb and MW#14@ 16 ppb

3) methoxytrimethylsilane in MW#l0 @ 9.1 ppb, MW#12 @ 5.1 ppb and MW#13 @

21 ppb

4) benzothiazole in MW#3 @ l0 ppb

5) benzene in MW#10 @ 0.79 ug/l; and

6) chlorobenzene in MW#15 @ 14 ppb

No explanation has been provided as to the sources of this contamination in groundwater.

(97 Correspondence.tif, Image 15)

A May 5, 1998 Regional Board letter to Santa Barbara County Public Works required that a subsurface investigation must be performed to determine whether the Landfill is or will be within five feet of underlying groundwater and that investigation of the buried alluvial zone of Pila Creek should be performed as well. This has not been addressed. In addition, the Board recommended further subsurface investigation of the possible VOC contaminant source(s) prior to liner installation and that a subsurface investigation of whether or not a more concentrated plume of leachate exists under the western edge and toe of the landfill to determine if the leachate is mixing with clean groundwater prior to entering the extraction trench. This has not been addressed either.

(98 Correspondence.tif, Images 64 thru 66)

A May 29, 1998, written notice documented two releases of leachate from a drain pipe from Landfill's leachate collection system and from an abandoned culvert at the south end of the waste mass was discharging approximately ten gallons per hour of contaminated water to Pila creek. Although the drain piping for the leachate system has been replaced and the culvert drain has been contained by interception and pumping to existing storage tanks, a long term solution for a long-term solution for the culvert has not been pursued.

(98 Correspondence.tif, Images 90 thru 92)

A June 19, 1998 Regional Board letter to Santa Barbara County Public Works issued a NOTICE OF VIOLATION regarding violation of Specification B.5 of Waste Discharge Requirements Order No. 93-69. Specifically, three instances were outlined as follows:

1) On December 9, 1997, Board staff inspected the Landfill and issued a Notice to Comply with Minor Violations based on drainage system problems (a violation of Discharge Specification B.33).

2) In a January 20, 1998, letter the Discharger informed the Board that leachate collection system piping had failed and a discharge of leachate occurred.

3) In a February 27, 1998, letter the Discharger informed the Board that the Leachate Collection System trench (Cutoff Trench) had overflowed and discharged to Pila Creek. The Discharger indicated the collection trench would be pumped and collected water would be used to wash down the wet weather disposal deck or discharged directly to the southern most in-creek sedimentation basin.

Additionally neighbors in vicinity of the Landfill registered numerous complaints, accompanied by photographic evidence, regarding excessive sedimentation and litter entrained in surface water discharge from the Landfill. A formal complaint and presentation to the Board was made at the January 30, 1998 Board meeting and followed up with an agendized item at the April 3, 1998 Board meeting in San Luis Obispo.

(98 Correspondence.tif, Images 70 thru 74)

A June 29, 1998, Regional Board Interoffice Memo regarding a Complaint/Impact Investigation Staff Report as per Board Order No. 93-69, stated that the landfill operators failed to heed the Board's October 21, 1997 letter specifically warning landfills to be prepared for the El Nino induced precipitation and that some advice on what additional measures should be implemented was also provided. It also states that Mercury and Arsenic were identified in Pila Creek, that mercury exceeded Ocean Plan standards on January 29, 1998, and that the source of these heavy metals had not been determined. This issue has still not been resolved. Furthermore, although the Monitoring and Reporting Program required the Landfill staff to perform regular onsite inspections to check for any compliance concerns, Staffs review of the Landfill's Fourth Quarter Monitoring Report indicated that problems with wet weather were not reported, except for a brief mention of recent precipitation levels. Also, many problems which did not occur on scheduled days of inspection were not reported either. An example is the fact that Pila Creek had sporadically contained trash and high levels of sediment which was not reported in recent monitoring reports. The internal memo also mentioned that Landfill's staff do not appear to be passed on Board staff's concerns to the Landfill's managers and that written communication in the form of Notices to Comply and notices of violation as well as other appropriate enforcement actions appear necessary to ensure that Landfill management acknowledges receipt of documentation of identified problems.

(98 Correspondence.tif, Images 76 thru 82)

A September 16, 1998, Regional Board comments on the August 12, 1998 Trench Water Management Plan which disagreed with the County's statement that, ". . some of the steps necessary to implement the Proposed Trench System Plan are beyond the control of the County." The Board also stated that the County's Plan lacked information regarding expected flow rates from the system during wet weather. Specifically, the Board pointed out that their interim plan for spray application of the collected liquid directly to an area on the western ridge line failed." Using direct application to land as a primary means of for applying thousands of gallons of water to already wet slopes may present stability problems, that concentrations of metals may accumulate in the area of the spray field, that soil samples should be collected and analyzed, that the proposed monitoring of runoff from the area did not specify what was going to be monitored, that no criteria had been proposed as to how data collected would be evaluated, and that no contingency plan had been made to establish thir course of action if impacts from the spray field are detected.

(98 Correspondence.tif, Images 122 and 123)

An August 27, 1999 Regional Board letter to Santa Barbara County Public Works stated that control of storm water discharge as required in the Board's Notice of Violation issued on June 19, 1998 had still not been completed after more than one year and that the Board may implement formal enforcement actions. The Board further stated that the County do not have adequate ability to control sediment-laden runoff or other unforeseen releases of waste from the landfill.

(99 Correspondence.tif, Image 77 thru 79)

RECOMMENDATIONS

The following measures are necessary to ascertain the potential for impacts to water quality and to determine the need for additional feasible corrective actions and mitigation measures to reduce such impacts.

1) Define the contacts between the existing landfill mass and all man-made conduits, all discernable artificial fill, disturbed soils, and formations through field subsurface investigation. This will reveal conduits for the migration of landfill contaminants to surface water and groundwater. All subsurface investigation should be conducted through a conductor casing. A structure contor map of the bottom of the landfill relative to GW table contout map should be produced to provide crossesction of the bottom of the landfill relative to the water table. Enegeneering designs must be developed and implemented for the purpose of

preventing the high water table from intersepting the landfill mass.

Maps and crossection of the bottm of the

2) Provide a detailed study of the faults at the site evaluating the potential impact on the existing landfill and on the proposed landfill expansion.

3) Special attention needs to be given to all potential point sources. A historical environmental audit of the types of waste that may have been placed in the landfill may yield specific point source locations of gasoline and solvent related constituents within the landfill to be investigated. The landfill operator has 90 days to perform subsurface investigations to define the point sources of all releases as well as the characteristics of all constituents of concern after a release has been confirmed (Article 4, §20425. (b) & (e)) . The VOCs identified in groundwater are from unauthorized release(s) from point sources(s) which have not been delineated.

4) Establish a groundwater monitoring well network curtain between the landfill waste and the Arroyo Quemada Community which intercepts all subsurface conduits that may exist between the source and the receptor.

5) Perform a water budget for each individual water body and each hydrostratigraphic unit as well as for the whole watershed.

6) Analyze the collection trench's effectiveness. The water balance must include a determination as to how much water is used for irrigation, what types of earth materials are undergoing irrigation, all methods of distribution and application of irrigation water, and where and when the irrigation is performed.

7) Perform a subsurface investigation which isolates all discrete water flow regimes from the landfill mass through the alluvium and beyond the interceptor trench as well as for the portion of the groundwater flow within the Vaqueros Formation which allegedly flows eastward and may discharge to the Arroyo Quemado alluvium. Geophysical methods like areal and vertical temperature surveys can be effective for this purpose. After these hydrogeological flow regimes have been defined through subsurface investigations, their characteristics should be evaluated by fate and transport modeling.

8) Collect continuous information on the water flow through the culvert systems including the total amount of water discharged at the surface water discharge point. Hydrographs and flow recorders will be suitable.

9) Provide a complete historical record with graphical descriptions in plan view and cross section of the evolution of the existing landfill waste mass relative to surrounding materials. Utilize past air photos, grading plans, geotechnical reports, etc.

REFERENCES

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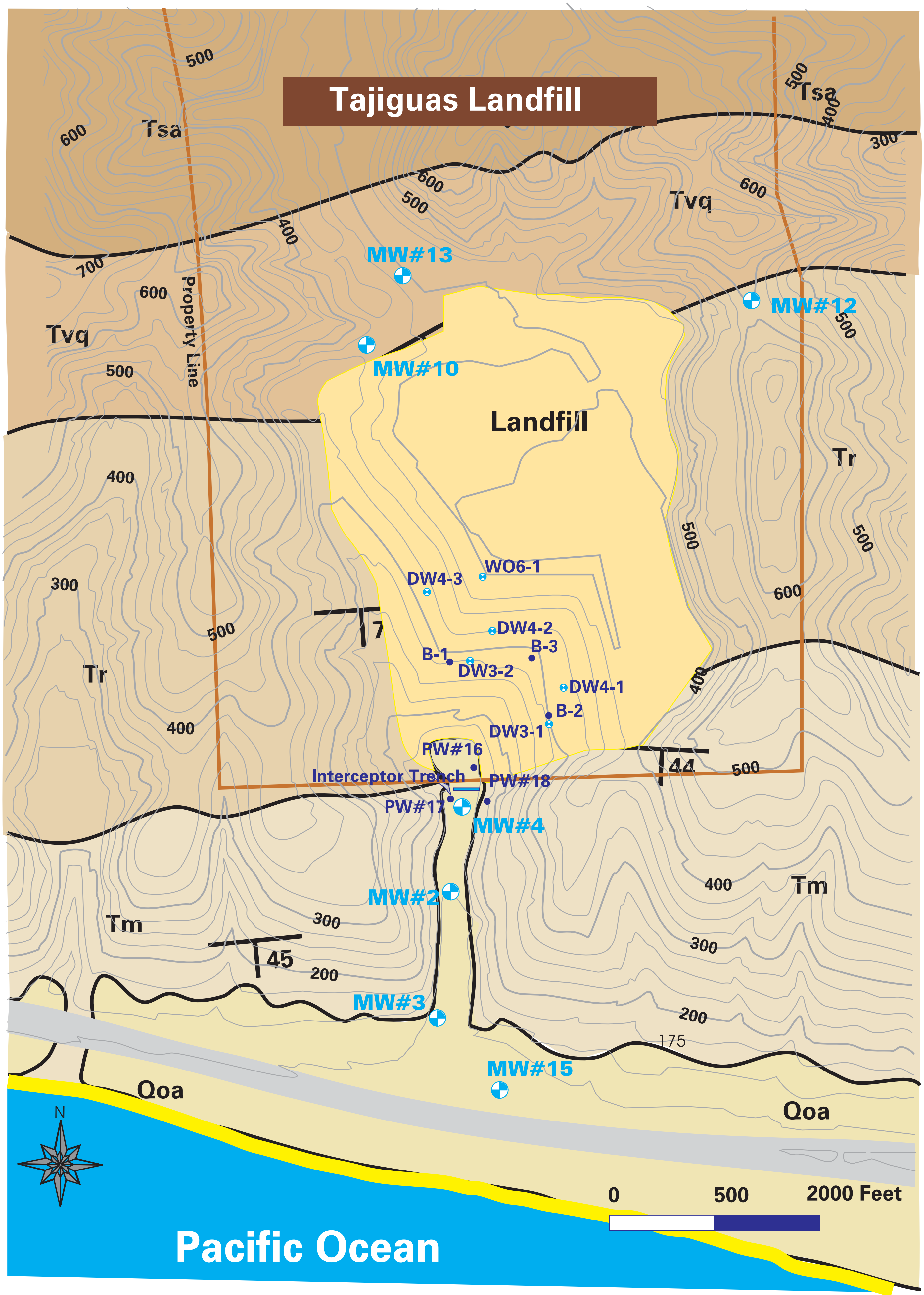
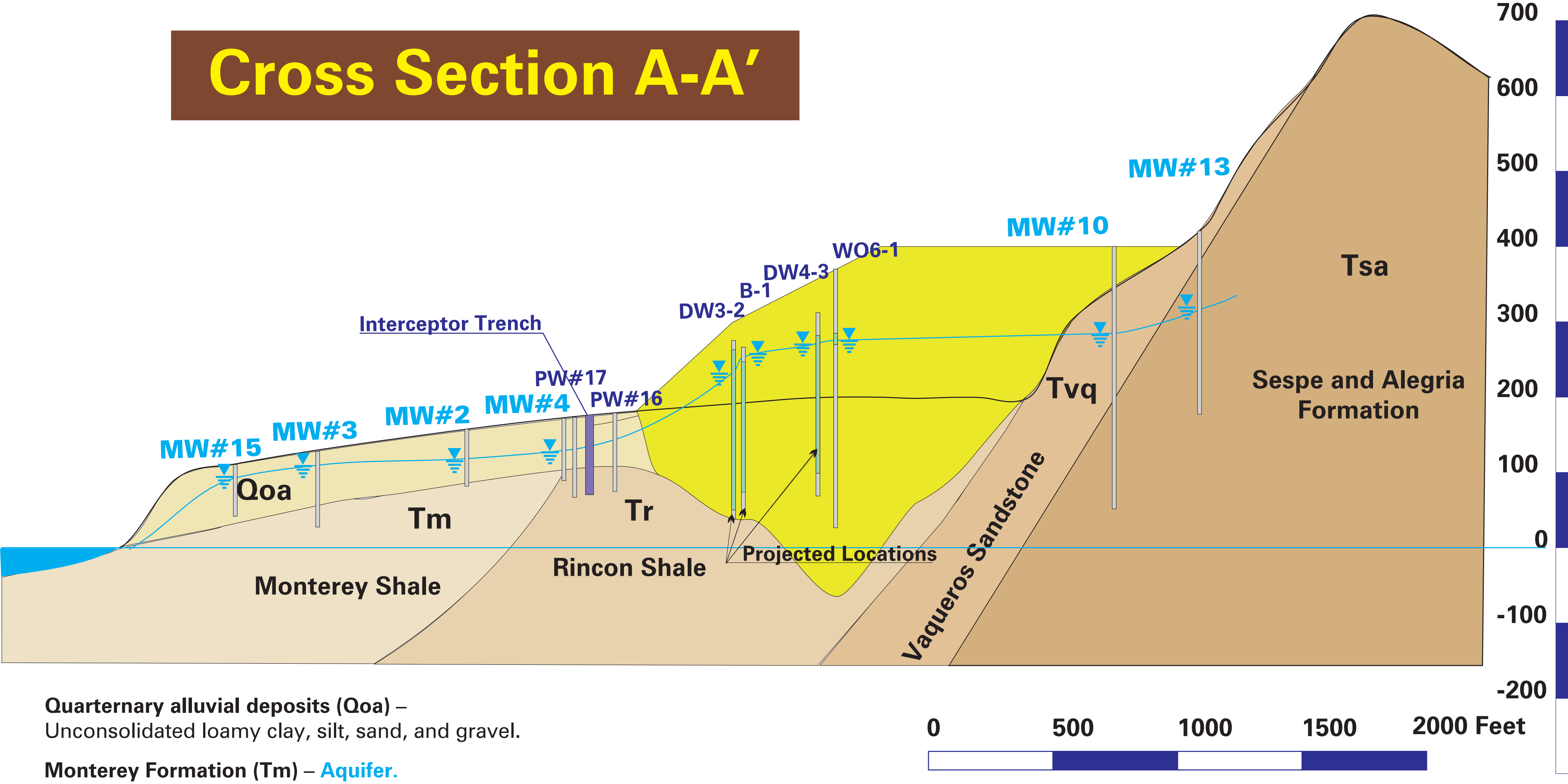


Tajiguas Landfill
Landfill
Property Line
Tsa
Tvq
Tr
Tm
Qoa
MW#13
MW#10
MW#12
WO6-1
DW4-3
DW4-2
B-1
B-3
DW3-2
DW4-1
B-2
DW3-1
PW#16
Interceptor Trench
PW#18
PW#17
MW#4
MW#2
MW#3
MW#15
45
44
N
Pacific Ocean
0
500
2000 Feet

Cross Section A-A'



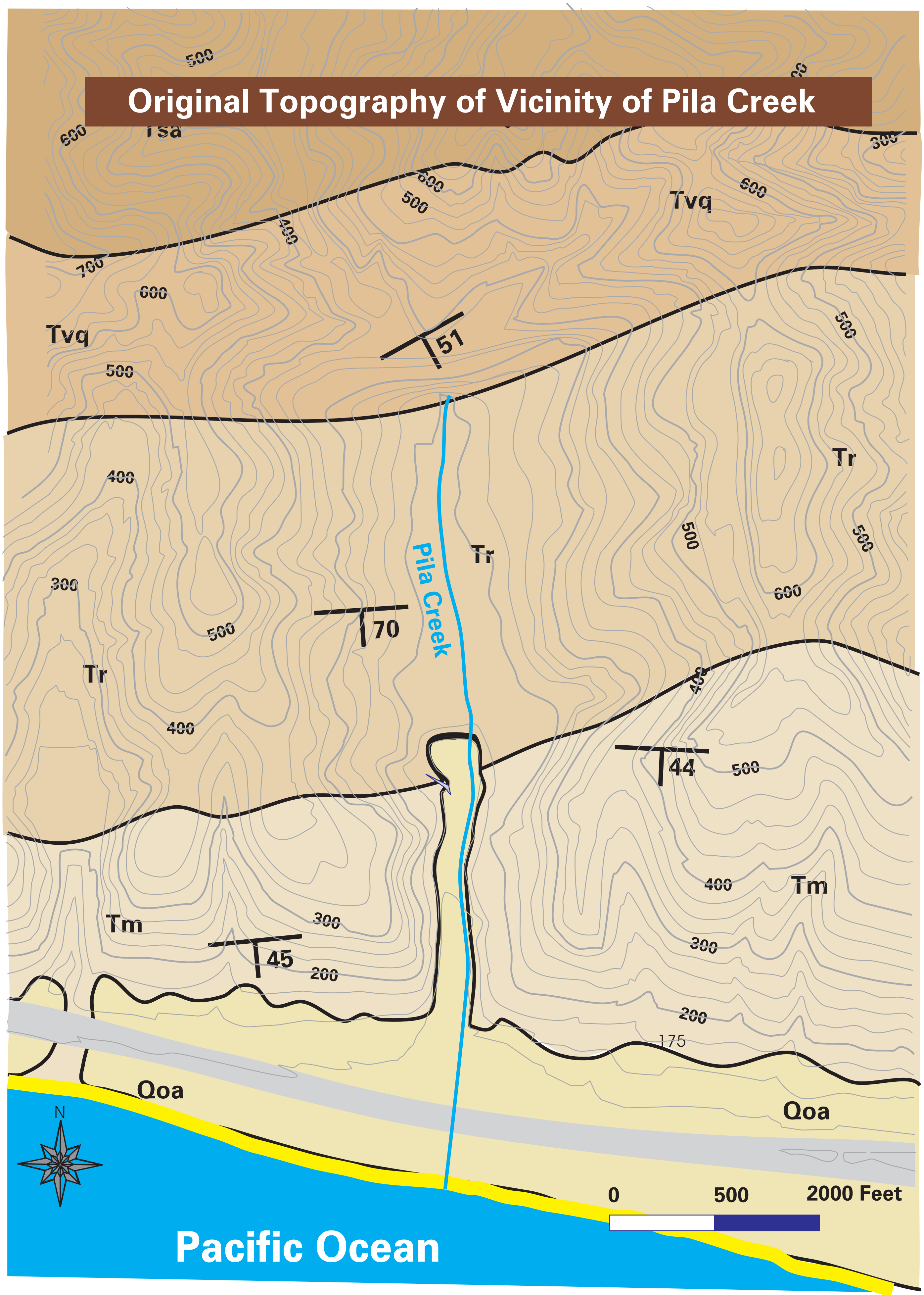
Quarternary alluvial deposits (Qoa) –
Unconsolidated loamy clay, silt, sand, and gravel.

Monterey Formation (Tm) – Aquifer.
Upper Miocene, consisting of buff-white, thickly bedded, highly fractured, siliceous marine shale (claystone and silistone, with some minor carbonate and tuff interbeds). The claystone is slightly to moderately fractured, and deeply weathered to a depth of approximately 28 feet below ground surface (bgs).

Rincon Formation (Tr) – A lower Miocene marine deposit comprised of grayish-brown, thin to poorly bedded marine siltstone and claystone. They weather to an expansive clay soil. The weathered zone reaches thicknesses of 15-20 ft in some locations. The unweathered Rincon is mainly massive, but zones of intensely fractured rock have been observed. The stratigraphic thickness of the Rincon is approximately 1,470 feet at the site. The Rincon Formation is considered relatively impermeable although locally it provides small quantities of water due to the secondary (fracture) porosity.

Vaqueros Formation (Tvq) – Aquifer. Lower Miocene, consisting of medium to coarse-grained, friable to hard, cross-bedded, massive sandstone. Soil weathered from the Vaqueros Formation is described as well-graded silty sand. The stratigraphic thickness of the Vaqueros Formation is approximately 670 feet at the site.The Vaquieros is the principal water-bearing formation in the region. It yields small to moderate quantities of water to wells.

Sespe and Alegria Formations (Tsa) – Aquifer. The stratigraphic thickness of this unit is 1,665 feet at the site. The Sespe Formation is comprised of massive medium-grained sandstones interbedded with siltstones. The Alegria Formation consists of massive sandstones, The Sandstones are moderately to well-cemented and locally form prominent ridges. The Sespe and Alegria Formations are aquifers in the region that also yield small to moderate quantities of water.



Original Topography of Vicinity of Pila Creek
Tsa
Tvq
Tr
Tm
Qoa
Pila Creek
51
70
44
45
700
600
500
400
300
200
175
N
0
500
2000 Feet
Pacific Ocean